

PATENT
Docket No. 98-126 US-RE-1
Case 187 P 151

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE
REISSUE APPLICATION OF:
U. S. Patent 6,015,299

ORIGINAL SERIAL NO.: 09/120,485
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FOR: CARD EDGE CONNECTOR WITH
SYMMETRICAL BOARD CONTACTS

ORIGINAL EXAMINER: J. Nasri

ORIGINAL GROUP ART UNIT: 2839

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Commissioner of Patents
Washington, D.C. 20231

Dear Sir:

PRELIMINARY AMENDMENT AND INFORMATION DISCLOSURE STATEMENT

Preliminary to the examination of the above-identified reissue patent application, please
amend the application as follows.

IN THE CLAIMS:

Please add the following new claims 24 through 49:

24. (Newly Added) A connector for interconnecting a printed circuit board having conductive
contact regions and a removable electrical component having a mating portion with a
plurality of conductive contacts, said connector comprising:
an elongated housing formed of insulating material and having a mating surface;

an opening in said mating surface of said housing for receiving said mating portion of said electrical component, said opening having an elongated centerline;

a plurality of transversely extending terminal receiving cavities in said housing, each cavity extending to both sides of said opening; and

a plurality of conductive terminals mounted in said cavities, said terminals including first and second groups of terminals, one of said groups being signal terminals for conducting signals between said contacts of said electrical component and said contact regions of said circuit board, the other of said groups being reference terminals for making ground and power connections between others of said contacts and said contact regions;

said terminals being generally planar and including spring arms extending into said opening for contacting said contacts of said electrical component when inserted therein and board contacts extending from said housing for contacting said contact regions of said circuit board;

said board contacts for all of the signal and reference terminals mounted in said housing cavities being generally arrayed solely in four lines parallel to said centerline, said four lines including an inner line and an outer line on each side of said centerline;

wherein two of said board contacts extend from each cavity;

wherein both of said board contacts extending from each cavity are from the same group of terminals, said inner lines include only board contacts of said first group of terminals and said outer lines include only board contacts of said second group of terminals.

25. (Newly Added) A connector as claimed in claim 24 wherein said first group of terminals are said reference terminals and said second group of terminals are said signal terminals.
26. (Newly Added) A connector as claimed in claim 25 wherein each cavity containing at least one of said signal terminals is adjacent to a cavity containing at least one of said reference terminals.
27. (Newly Added) A connector as claimed in claim 26 wherein each cavity containing at least one of said signal terminals is between two cavities containing at least one of said reference

terminals.

28. (Newly Added) A connector as claimed in claim 24 wherein said terminals are flat, planar stamped plates of metal.
29. (Newly Added) A connector as claimed in claim 28 wherein said board contacts are solder tails.
30. (Newly Added) A connector as claimed in claim 24 wherein each said signal terminal includes one of said spring arms and one of said board contacts, and two of said signal terminals are mounted in each cavity with one of said signal terminals on each side of said opening.
31. (Newly Added) A connector as claimed in claim 24 wherein each said reference terminal includes two of said spring arms and two of said board contacts, and said reference terminals are mounted one to a cavity with said spring arms and board contacts on opposite sides of said opening.
32. (Newly Added) A connector comprising:
an elongated insulative housing including an opening having a longitudinal axis;
a plurality of terminal receiving cavities extending perpendicularly to said opening and extending to both sides of said opening;
a plurality of terminals mounted in said cavities, said terminals including a plurality of identical terminal sets mounted in parallel face-to-face relation in adjacent ones of said terminal receiving cavities;
each of said terminal sets including a reference terminal in one cavity extending to both sides of said opening and a pair of identical signal terminals in said adjacent cavity;
said signal terminals being oppositely oriented and being disposed on opposite sides of said opening; and
said reference terminal having a generally planar, plate-like body including a pair of

flexible spring arms extending upwardly from said body and a pair of board contacts extending downwardly from said body, the plane of said body being generally perpendicular to said longitudinal axis of said opening.

33. (Newly Added) The connector of claim 32 wherein said signal terminals have a generally planar, plate-like body and a single flexible spring arm extending upwardly from said body and a single board contact extending downwardly from said body, said body being generally perpendicular to said longitudinal axis of said opening.

34. (Newly Added) A card edge connector for interconnecting a printed circuit board having conductive contact regions and a removable printed circuit card having a mating edge with a plurality of conductive contact pads, said card edge connector comprising:
an elongated housing formed of insulating material and having a mating surface;
an elongated slot in said mating surface of said housing for receiving said mating edge of said circuit card, said slot having an elongated centerline;
a plurality of transversely extending terminal receiving cavities in said housing, each cavity extending to both sides of said slot; and
a plurality of conductive first and second terminals mounted in said cavities, said first and second terminals being differently configured, said terminals including spring arms with contact portions extending into said slot for contacting said contact pads of said circuit card when inserted therein and board contacts extending from said housing for contacting said contact regions of said circuit board, said contact portions of one of said first and second terminals being closer to said mating surface than said contact portions of the other of said first and second terminals, said first terminals being generally planar;
said board contacts for all of the first and second terminals mounted in said housing cavities being arrayed solely in four lines parallel to said centerline, said four lines including an inner line and an outer line on each side of said centerline;
wherein two of said board contacts extend from each cavity;
wherein said board contacts of said first terminals lie only in said inner lines and said board contacts of said second terminals lie only in said outer lines.

35. (Newly Added) A card edge connector as claimed in claim 34 wherein said first terminals are reference terminals and said second terminals are signal terminals.
36. (Newly Added) A card edge connector as claimed in claim 35 wherein each cavity containing at least one of said signal terminals is adjacent to a cavity containing at least one of said reference terminals.
37. (Newly Added) A card edge connector as claimed in claim 36 wherein each cavity containing at least one of said signal terminals is between two cavities containing at least one of said reference terminals.
38. (Newly Added) A card edge connector as claimed in claim 34 wherein said terminals are flat, planar stamped plates of metal.
39. (Newly Added) A card edge connector as claimed in claim 38 wherein said board contacts are solder tails.
40. (Newly Added) A card edge connector as claimed in claim 34 wherein each said signal terminal includes one of said spring arms and one of said board contacts, and two of said signal terminals are mounted in each cavity with one of said signal terminals on each side of said slot.
41. (Newly Added) A card edge connector as claimed in claim 34 wherein each said reference terminal includes two of said spring arms and two of said board contacts, and said reference terminals are mounted one to a cavity with said spring arms and board contacts on opposite sides of said slot.
42. (Newly Added) A connector for interconnecting a printed circuit board having conductive contact regions and a removable electrical component having a mating portion with a plurality of conductive contacts, said connector comprising:

an elongated housing formed of insulating material and having a mating surface;

an elongated opening in said mating surface of said housing for receiving said mating portion of said electrical component, said opening having an elongated centerline;

a plurality of transversely extending terminal receiving cavities in said housing, each cavity extending to both sides of said opening; and

a plurality of conductive first and second terminals mounted in said cavities, said first and second terminals being differently configured, said terminals including spring arms with contact portions extending into said opening for contacting said contacts of said electrical component when inserted therein and board contacts extending from said housing for contacting said contact regions of said circuit board, said contact portions of one of said first and second terminals being closer to said mating surface than said contact portions of the other of said first and second terminals, said first terminals being generally planar;

said board contacts for all of the first and second terminals mounted in said housing cavities being arrayed solely in four lines parallel to said centerline, said four lines including an inner line and an outer line on each side of said centerline;

wherein two of said board contacts extend from each cavity;

wherein said board contacts of said first terminals lie only in said inner lines and said board contacts of said second terminals lie only in said outer lines.

43. A connector as claimed in claim 42 wherein said first terminals are reference terminals and said second terminals are signal terminals.
44. A connector as claimed in claim 43 wherein each cavity containing at least one of said signal terminals is adjacent to a cavity containing at least one of said reference terminals.
45. A connector as claimed in claim 44 wherein each cavity containing at least one of said signal terminals is between two cavities containing at least one of said reference terminals.
46. A connector as claimed in claim 42 wherein said terminals are flat, planar stamped plates of metal.

47. A connector as claimed in claim 46 wherein said board contacts are solder tails.
48. A connector as claimed in claim 42 wherein each said signal terminal includes one of said spring arms and one of said board contacts, and two of said signal terminals are mounted in each cavity with one of said signal terminals on each side of said slot.
49. A connector as claimed in claim 42 wherein each said reference terminal includes two of said spring arms and two of said board contacts, and said reference terminals are mounted one to a cavity with said spring arms and board contacts on opposite sides of said opening.

REMARKS

The amendments are made at the time of filing this reissue application and presented as additions to original Patent No. 6,015,299. Claims 1 through 23 of that '299 patent remain as originally issued and are not amended by this paper.

By this reissue application, the inventors and assignee intend to broaden the scope of the originally issued claims 1 through 23. Newly added claims 24 through 49 include changes which are in line with this intent to broaden.

The newly added claims are presented as sets of claims patterned after sets of the originally issued claims. Claims 24 through 31 are patterned after originally issued claims 6 through 13. Claims 32 and 33 are patterned after claims 14 and 15. Claims 34 through 41 are patterned after originally issued claims 16 through 23. Claims 42 through 49 also are patterned after originally issued claims 16 through 23.

The changes in these claims address errors in the original patent which claim more or less than the inventors and patentee had the right to claim in the '299 patent. The errors thus corrected are summarized as follows.

Originally issued claims 6 through 13 specify a connector which is a card edge connector, and the patent claims less than patentees had the right to claim. Support in the disclosure of the '299 patent for these changes is provided by the Background of the Invention in column 1 and

the Summary of the Invention in column 2, as well as claim 1, which describes the invention as being to connectors in general. New claims 24 through 31 remove all reference to “card” and to “edge” in order to preclude an attempt to interpret these claims as requiring the connector to be on a card and also on an edge of the card.

Originally issued claim 6 specifies that the mating edge has “contact pads,” and new claim 24 revises “contact pads” to “contacts.” Support in the disclosure is provided by the support specified above for removal of “card” and of “edge”, inasmuch as the “contact pads” are components of edge cards. This change precludes an attempt to interpret this claim as requiring pads.

Originally issued claim 6 specifies that “an elongated slot” is in the mating surface of the housing. New claim 24 replaces the quoted language with “an opening.” Support is provided by the disclosure noted above for removal of “card” and “edge”, since the elongated slot is for receiving the card edge. This is mentioned at lines 64-65 of column 3. This change precludes an attempt to interpret this claim to exclude openings that do not have a specific shape.

Originally issued claim 6 states in the second clause after “comprising” that the slot has an elongated centerline “therealong coinciding with the center of said circuit card when mated.” Again, this quoted language relates to cards, and its removal is supported as noted above. This quoted language is omitted from newly added claim 24 in order to preclude an attempt to interpret the claim to require that respective centerlines of the connector and opening must coincide.

Referring next to newly added claims 32 and 33, neither includes reference to “card” or “edge.” Claim 32 refers to “an opening” rather than “an elongated slot.” The reasons for these changes are as noted above for other newly added claims which present these changes.

Claim 34 differs from originally issued claim 16 by omitting “therealong coinciding with the centerline of the circuit card when mated” from the second clause after “comprising.” The reasons for this change are as specified above for claim 24. Claims 35 through 41 follow originally issued claims 17 through 23, with minor editorial revisions being present in claims 40 and 41.

Newly added claim 42 differs from originally issued claim 16 in the same manner as does claim 34. In addition, none of newly added claims 42 through 49 includes reference to “card” or “edge.” Claim 42 refers to “an opening” rather than “an elongated slot.” The reasons for these changes are as specified above for other newly added claims which incorporate these changes.

Minor editorial revisions are present in claims 48 and 49.

INFORMATION DISCLOSURE STATEMENT

The references listed on the attached forms PTO/SB/42 are called to the attention of the U.S. Patent and Trademark Office. Applicants do not enclose a copy of any of the references except for No. 6,287,132, which issued after the '299 patent and was not cited thereagainst.

The remaining listed references are of record in Patent No. 6,015,299 upon which the present reissue application relies for an earlier effective filing date under 35 U.S.C. 120. Accordingly, pursuant to 37 C.F.R. § 1.98(d), although copies of these references are not submitted herewith, applicants understand each reference is properly and timely brought to the attention of the Office by this Information Disclosure Statement. The attention of the Office also is directed to the prosecution of said U.S. Patent No. 6,015,299.

This statement is provided in order to comply with 37 C.F.R. § 1.56, § 1.97 and § 1.98, and this statement is not to be construed as a representation that no information exists which is more material than these references, that the information is considered to be material to patentability, or that any one of the references or information is prior art to the present reissue application or to the '299 patent.

Favorable action is respectfully requested.

Respectfully submitted,



Raymond M. Mehler, Reg. No. 26,306

COOK, ALEX, MCFARRON, MANZO,
CUMMINGS & MEHLER, LTD.
200 West Adams Street, Suite 2850
Chicago, Illinois 60606
Tel: (312)236-8500
Fax: (312)236-8176

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